



System of
Environmental
Economic
Accounting

Update of the SEEA Central Framework

DRAFT Guidance Note

Issue A.1

**“Providing a broad overview of the links between
SEEA CF and SEEA EA”**

Version: August 2026

GUIDANCE NOTE Issue A.1 “Providing a broad overview of links between SEEA CF and SEEA EA”

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EXECUTIVE SUMMARY

Description of issue

1. This guidance note is to provide guidance on the treatment of issue A.1 in the update of the SEEA CF. *"The SEEA CF should include a broader overview of the links and overlaps between SEEA CF and SEEA EA (based on what is already in SEEA EA). This includes describing links between natural inputs, provisioning services and abiotic flows, and between natural resources and ecosystem assets."*

It is useful to note that during the development of the 2014 SEEA CF, Ecosystem Accounting was considered to be experimental. In recognition of the need for coherence across the System of Environmental-Economic Accounting as a whole, the SEEA CF update process sought the inclusion of links between CF and SEEA Ecosystem Accounting (EA). In this way, the SEEA CF will be richer and more coherence with EA in understanding how national accounting can encapsulate the depth of the environment under an economic lens. As the SEEA CF is also seen as a complete set of accounts, it is also necessary to recognise overlapping elements.

Summary of proposals

2. This guidance note proposes to update references in chapters 1 and 2 to address the relationship between SEEA CF and SEEA EA. It is proposed to include a new sub-section or appendix that gives an overview of the links and differences between SEEA EA and SEEA CF, aligned with the approach taken in SEEA EA Appendix A1.2, with references to where issues are discussed further in SEEA CF.
3. It is proposed to introduce the term abiotic flows in SEEA CF, with the same definition used in SEEA EA:
 - a. *Contributions to benefits from the environment that are not underpinned by, or reliant on, ecological characteristics and processes* (SEEA EA paragraph 6.35). Abiotic flows contrast with ecosystem services, which are underpinned by ecological characteristics and processes involving a combination of biotic and abiotic components of ecosystems (SEEA EA paragraph 6.36). Abiotic flows include several natural inputs in SEEA CF (minerals, energy, water).
4. The presentation of supply and use tables in chapter 2 could be modified to include an expanded table including ecosystem services into the generic supply and use table as well as expanded destination for residuals (pending discussion in Issue B6). At the least some note that some provisioning services should be sourced from ecosystems in the core tables.
5. Clarify the relationship between land cover, land use and ecosystem types in Section 5.6 Asset accounts for land, including a new paragraph after in Section 5.6.1 (after paragraph 5.238) and revision of Section 5.6.6 Links to ecosystem accounting.

6. Clarify in paragraph 5.30 and in section 5.6.4 Physical asset accounts for forest and other wooded land that the focus of SEEA CF is on accounting for forest land rather than forest ecosystems, with an explicit distinction and differentiation between the two. Refer to SEEA EA for accounts that focus on forest ecosystems. SEEA CF should refer to "forest land" consistently, not abbreviated to "forest" (this is consistent with how forest land is referred to in the SNA.)
7. Introduce species accounts (drawing from section 13.3.3 SEEA EA), with a focus on accounts for species linked to biological resources.
8. There are two options for incorporating the lessons from SEEA EA on the topic of monetary valuation:
 - a. Consider moving all of the discussion on valuation to a chapter or large section (similar format to SEEA EA).
 - b. Consider extending or rewriting section 2.7.3 on valuation in Chapter 2 to include text on the range of options for valuation reflecting the approach in section 8.1 of SEEA EA and extend beyond the NPV estimation process. Noting that NPV measures are the preferred option for depletion estimates in the SNA (Issue 9.1).

Questions for Global consultation

9. Global consultation question: Do you agree that a new sub-section or appendix giving an overview of the links between SEEA CF and SEEA EA should be included?
10. Global consultation question: Do you agree that the term abiotic flows should be introduced in SEEA CF, with the same definition used in SEEA EA?
11. Global consultation question: Do you agree that the framework for supply use tables and asset tables should include updates taking into account of SEEA EA?
12. Do you agree with the proposed distinction between forest land (as a focus in SEEA CF) and forest ecosystems (as a focus in SEEA EA)?
13. Global consultation question: Do you agree with that SEEA CF should include an update on monetary valuation based on insights gained from SEEA EA?

1 INTRODUCTION

1.1 Purpose of the Guidance note

1. The purpose of this guidance note is to provide guidance on the treatment of issue A.1 in the update of the SEEA Central Framework (CF).
2. SEEA Ecosystem Accounting (EA) was adopted in 2021 some eight years after the adoption of SEEA CF. Significant conceptual development of environmental economic accounting progressed leading up to the publication of the SEEA EA.
3. After global consultation of the key issues facing the update of SEEA CF, issue A.1 was described to be: *“The SEEA CF should include a broader overview of the links and overlaps between SEEA CF and SEEA EA (based on what is already in SEEA EA). This includes describing links between natural inputs, provisioning services and abiotic flows, and between natural resources and ecosystem assets.”*
4. In the process of initial consulting on the issue, changes in text, gaps in terminology and ensuring clear alignment between the application of economic concepts on the environment were key to linking SEEA EA and SEEA CF. Other aspects related to monetary valuation based on lessons from the SEEA EA process and clarifying the distinction between depletion and degradation were also seen as important considerations.
5. This guidance note will consider:
 - a. The need for an overarching description of the links between SEEA CF and SEEA EA
 - b. The inclusion of the term abiotic flows in SEEA CF, aligned with its use in SEEA EA and linked to natural inputs
 - c. The treatment of assets, services and the production boundary between SEEA EA and SEEA CF
 - d. The use of species accounts linked to biological resources
 - e. Treatment of the relationship between land cover, land use and ecosystem types.
 - f. Treatment of forest land and forest ecosystems.
 - g. Treatment of monetary valuation

1.2 Motivation for the issue

6. One of the key strengths of the family of national accounting is the ability for each of the statistical measures to be coherent with each other. As the practice of environmental economic accounting improves over time, changes are introduced into the accounts which then need reconciling across each of the accounts. This is similar to the group of changes needed around Issue A.9, which deals with the changes from the System of National Accounts (SNA) 2025 process.

7. Ultimately providing better links and clarity around some of the conceptual frameworks between SEEA CF and SEEA EA will enable a more coherent picture of the state and use of the environment in an economic context.

1.3 Structure of the GN

8. This guidance note has five sections:
 - a. An introduction
 - b. A summary of existing measurement and research
 - c. Options and possible treatments
 - d. Proposals and recommendations
 - e. Other considerations in progressing this issue.

2 SUMMARY OF EXISTING MEASUREMENT AND RESEARCH

Overview of links between SEEA CF and SEEA EA

9. SEEA CF and SEEA EA are designed to complement each other, thereby providing a complete description of the relationship between the environment and the economy through the application of the same accounting principles. There are strong connections between accounting for some individual environmental assets (in SEEA CF) and accounting for ecosystem assets and services (in SEEA EA). SEEA EA includes a brief appendix (Appendix A1.2) that gives an overview of the links and distinctions between SEEA EA and SEEA CF, summarised in Annex 1.
10. It is proposed to include a new sub-section or appendix in SEEA CF that gives an overview of the links and differences between SEEA EA and SEEA CF, aligned with the approach taken in SEEA EA Appendix A1.2, with references to where issues are discussed further in SEEA CF. This could expand on the current wording in chapter 2 on the links between SEEA CF accounts and the potential for linking various ecosystem accounts, for example:
 - a. Pressure accounts potential link to the construction of ecosystem condition accounts if they are at the right spatial scale.
 - b. The relationship between land accounts and ecosystem extent accounts.
 - c. The overlap of some ecosystem services with natural inputs and the indirect use of some ecosystem services to allay economic pressures on ecosystems.
 - d. Links between carbon stocks and flows in SEEA CF and global climate regulation services (carbon storage and sequestration) in SEEA EA.
 - e. The relationship between forest land in SEEA CF and forest ecosystems in SEEA EA.

- f. The relationship between water as an abiotic flow and water-related ecosystem services in SEEA EA.
- g. The coherence in approaches for monetary valuation of assets, noting the alignment of the production boundary between SEEA EA assets and SEEA CF and SNA assets.
- h. Noting the exclusion of a 'full value' for nature from a SEEA perspective and that approaches for non-market valuation will impact on the ability of aggregate measures for the environment. This could serve as a warning about the potential for double counting.

Abiotic flows

11. The terms “abiotic” and “biotic” are used extensively in SEEA EA but minimally in the SEEA CF . In the SEEA CF abiotic is used in relation to abiotic (non-living) surfaces in a land cover context (e.g. para 5.257). In the SEEA EA 'abiotic' is used in relation to components and characteristics of ecosystems (“biotic and abiotic components”; “biotic and abiotic characteristics”) and in relation to some flows from the environment. This follows the broad distinction and meaning in ecology of “biotic” (related to organisms and organism-mediated influences or interactions in an ecosystem) and “abiotic” (non-living physical or chemical conditions or components of an ecosystem).
12. Abiotic flows are defined in SEEA EA as "contributions to benefits from the environment that are not underpinned by, or reliant on, ecological characteristics and processes" (SEEA EA para. 6.35). They are contrasted with ecosystem services, which are underpinned by ecological characteristics and processes involving a combination of biotic and abiotic components of ecosystems. From SEEA EA paragraph 6.36: “Ecosystem services are underpinned by various ecological characteristics and processes that involve both biotic and abiotic components to varying degrees. Thus, ecosystem services encompass services that are both predominantly biotic (e.g. air filtration services provided by forests) and predominantly abiotic (e.g. coastal protection services provided by sand dunes).”
13. Note that there is no reference to “biotic flows” in SEEA EA, as there are no flows that are purely biotic. Rather, the contrast is between flows that are purely abiotic and ecosystem service flows that combine biotic and abiotic elements.
14. Several of the natural inputs considered in SEEA CF are abiotic flows from the environment in the sense used in SEEA EA, including minerals, energy and water. It would be useful to make this link explicit, and to emphasise that abiotic flows fall within the scope of SEEA CF rather than SEEA EA. For water in particular, it would be useful to clarify that water as an abiotic flow is best accounted for using SEEA CF, while water-related ecosystem services (such as water flow regulation and water purification) fall within the scope of SEEA EA.
15. Environmental assets may be distinguished according to whether they are biological or non-biological, rather than biotic or abiotic. Flows arising from non-biological environmental assets—such as mineral, energy and water inputs—are abiotic flows in the sense used in SEEA EA, while flows arising from biological resources may constitute ecosystem services. However, the

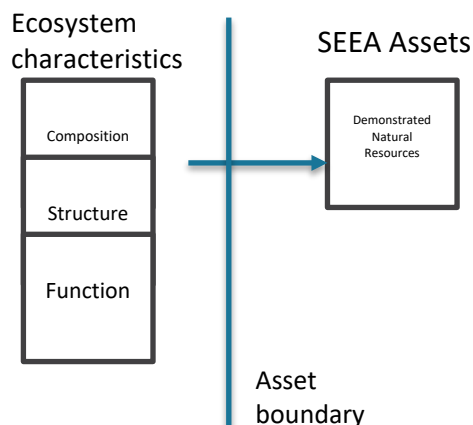
distinction between biological and non-biological environmental assets should not be treated as directly equivalent to the distinction between ecosystem services and abiotic flows.

16. Some of the insights from SEEA EA in regard to the distinction between ecosystems and natural resources suggest:
 - a. SEEA CF is primarily focused on the consumption of natural resources (SEEA EA para A1.16)
 - b. SEEA CF focuses on individual assets without consideration of the broader context or system in which those assets are located (SEEA EA para A1.20)
 - c. While SEEA CF introduces the concept of degradation, there is no evident link between depletion of natural resources and degradation of ecosystem assets (SEEA EA para A1.25 – A1.26)

Treatment of ecosystem assets, services and the production boundary in SEEA CF

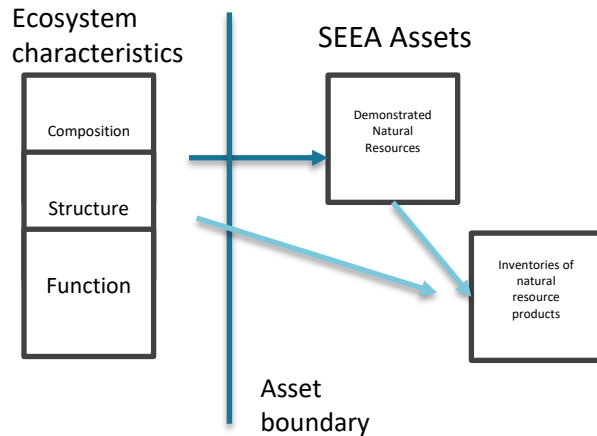
17. The SEEA CF asset and flow tables specifically deal with account entries that are in the production boundary or considered as close to the production boundary in the case of some mineral assets. The SEEA EA refined the definition of environmental assets outside of the production boundary for both quantity and more importantly location. A part of the discussion on where SEEA EA has broad links with SEEA CF is to update the roles of supply and use tables and asset tables that reflect insights from SEEA EA.
18. In the first instance, we need to visualise the concept of how SEEA CF asset and SEEA EA ecosystems interact can be done in a step by step approach, though this would normally be a single diagram in the accounts.
19. For physical accounts we can note Figure 1, that shows a simple link between environmental assets in a SEEA CF context and ecosystem characteristics which are the basis of ecosystem assets, classified into different ecosystem types. The creation of a natural resource asset has a number of distinct features: 1. The creation of ownership rights to the resource and 2. A classification change to commercially recoverable resources in the case of non-renewable resources. For renewable resources the model still holds, though there is a generally a passing through to the next phase of the model (Figure 2), though there is a case for noting any permits to collect these resources.
20. The use of a spatial scale is important when considering a link between ecosystems and individual environmental assets. For SEEA CF usually national accounting for assets is sufficient but as Issue A4 suggests, having a spatial scale can enhance the information provided by the accounts. When linked to SEEA Ecosystem Accounts with a sub-national or even local scale, there are better opportunities to explore the impact of harvesting environmental assets on their surrounding ecosystems.

Figure 1, step one, ecosystems and natural resource asset creation



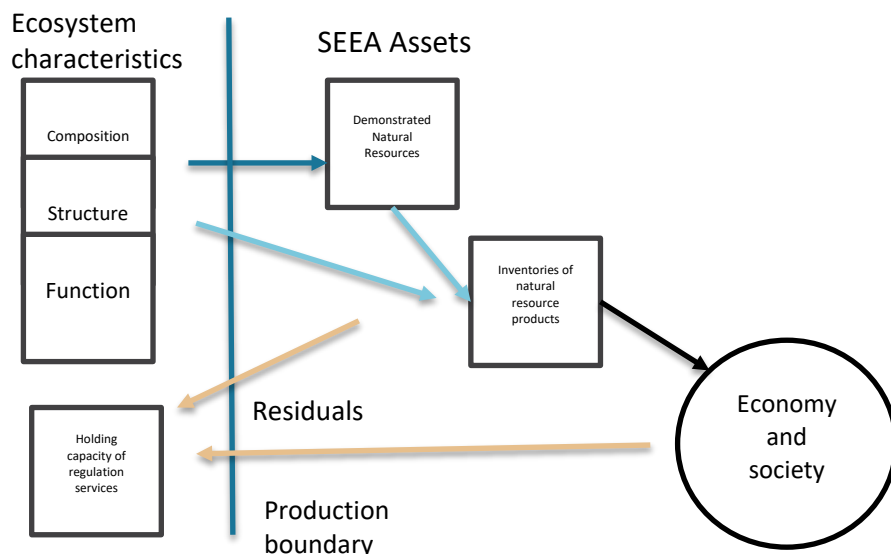
21. In the second step, figure 2, we note the creation of inventories for the purposes of supplying products to the economy. This represents both harvesting from natural resource assets and supply of SNA benefits from ecosystems. This aligns well with the concept of a finished good in SNA 2025 (p11.145).
22. The challenge here is considering the impact of uncultivated and cultivated biological resources. Issue 9 concluded that cultivated biological resources are excluded from the SEEA CF, but we know that uncultivated biological resources don't cross the asset boundary until they are harvested. Thus as most of biological related ecosystem services are once off products that form finished goods, then we can consider them as additions to inventories. As to the question of repeat products there are three things to consider:
 - a. SEEA CF typically excludes repeat or produced biological natural resources from an SNA perspective. This is due to the asset boundary, where ecosystems lie on the side where there is no market activity, hence if there are managed natural resources, then these are no longer ecosystem services, but are part of the standard economic accounts.
 - b. Products that are harvested (or consumed) from ecosystems cross the asset boundary (and production boundary) and become finished goods from the harvester's perspective.
 - c. Repeat ecosystem services such as crops from orchards and vineyards appear in SNA but are generally out of scope for SEEA CF. The development of SEEA Agriculture, Fishing and Forestry (AFF) did take into account of this overlap between environmentally related ecosystem repeat products and once off products. One outcome could be that further development of SEEA AFF to be updated to include the standard model approach from Issue A8 and cover all biological resources repeat or otherwise.

Figure 2, step two, treatment of environmental products



23. In the third step figure 3 is the treatment of inventories or capacity from ecosystems to regulate pressures (residuals) from economic processes. At the moment SEEA doesn't have a natural fit for a capacity style measure of regulating services. Let's explore this for a few moments. It's difficult to ascertain if regulating services are actual economic services. There is no intangible product, nor is there any human input to the production of SNA benefits. However, if we examine more closely the relationship between ecosystems as a sink and the act of depositing externalities, there is more of a warehousing operation than a cleaning service.
24. Ecosystems will store waste materials before assimilating them. Assimilation times are based on the type of material, with some elements (Carbon) being absorbed within the accounting period, others (radioactive elements) may take millennia before being neutralised. SEEA EA handles this relationship through independent measurement of condition and the type of ecosystem service. SEEA CF currently just records the flow of material or heat.
25. Here we see the conceptual nature of regulating services being an offset to returns from the economy where they are not managed from within the economy. Issue B6 Pressure accounts call this the modular approach and could better represent sustainability if there are measures of the capacity for ecosystems to store waste materials, as well as ecosystem accounts dealing with assimilation rates leading to observations of condition changes.

Figure 3 step three, creation of assets for treating residuals



26. Annex 3 has examples of mineral resources and timber resources in context with the above model. The section on valuation below discusses the monetary accounting conceptual treatment. Issue A8 will go into more depth on linking assets, flows and environmental activity expenditure, but this is a good starting point.
27. While these steps take into account the creation of natural resources they will need to note that linking SEEA EA to changes in SEEA CF will often need spatially detailed accounts (Issue A4) to link the creation of the asset to location based changes to ecosystems.
28. The implication for the production boundary therefore seems to be one of ownership rights, either as a permit for harvesting or the creation of an ownership right. This can take into account of Issue 9.1 on the adoption of SNA 2025. It is useful to note that SEEA EA has considered this in para A1.14 which formalises the distinction between SEEA CF assets and SEEA EA accounts. In the mineral accounts case in Annex 3, the creation of the natural resource asset is formed by government and then bought by non-financial corporations, hence sharing the depletion cost.
29. This also helps to define the distinction between depletion and degradation considered in the SEEA CF and SEEA EA. The update in SNA 2025 formalises depletion as a cost of production, aligning with the notion in the SEEA CF that *“Depletion refers to a physical using up of natural resources through extraction, abstraction and harvest by economic units that results in a reduced availability of the resource in the future at current extraction rates.”* (SEEA CF Para 2.95). SEEA CF also notes degradation as *“Degradation considers changes in the capacity of environmental assets to deliver a broad range of contributions known as ecosystem services (e.g., air filtration services from forests) and the extent to which this capacity may be reduced through the action of economic units, including households.”* (para 5.90)
30. The context in SEEA EA further developed the association with degradation, defining it as: *“Ecosystem degradation is the decrease in the value of an ecosystem asset over an accounting period that is associated with a decline in the condition of the asset during that accounting*

period.” (SEEA EA para 5.124, further elaborated in Section 10.2). The decline in the value of an ecosystem asset results from a decline in the value of future ecosystem service flows from that asset. This distinction between SEEA CF and SEEA EA has constrained the definition of degradation to monetary measures based on asset value. Any physical changes to the characteristics of ecosystems are contained within condition accounts by ecosystem asset.

31. There is no link between depletion of natural resources in the SEEA CF and any impact it has on Ecosystems in the set of existing standards. Thus standards there is no clear distinction between physical depletion of natural resources and monetary value of degradation of ecosystem assets. For example, a company can acquire the rights to harvest minerals from a woody ecosystem, use an open cut mining technique, deplete the resource and cover over the site. Meanwhile the ecosystem changes condition over the life of the mine, potentially undergoing an ecosystem conversion if there is sufficient compositional changes. In SEEA CF we would observe the creation of the asset, the depletion of the asset and potentially any restoration expenditure to mitigate further damage to the environment. SEEA EA entries would be measured independently noting a decrease in condition, potentially extent and a reduction in ecosystem services.
32. We can observe changes to the ownership of some natural resources that are originally a part of ecosystems (figure 1 above), and the subsequent depletion of these newly characterised natural resource assets. Any changes to ecosystem extent and condition are therefore measured independently of decreases in natural resource assets, unless there is a spatial link made between the ecosystem asset from which the natural resource asset was developed. Thus, degradation under current definitions can be seen as independent of depletion activities.
33. It would seem that the only way to link depletion and degradation in this case would be for spatial accounting techniques (Issue A4).
34. It is worth noting that Issue B6 is examining the development of pressure accounts which could consider a more direct link from the externalities of economic activity and ecosystem condition. Though this by the monetary definition of degradation won't be an impact until it changes the ability of the underpinning ecosystem asset to provide services.
35. In conclusion for the discussion around depletion and degradation, the similarities between them are their basis in assets, the way in which they are calculated based on reduction of future income or service, and are generally seen as a monetary account characteristic. The wording in the SEEA CF could reflect this position and any links in physical assets to physical flow accounts should be covered in Issue A8.

Treatment of the relationship between land cover, land use and ecosystem types.

36. SEEA CF includes asset accounts for land, based on land cover or land use as two primary views of land for environmental accounting purposes,¹ and suggests the potential extension of land accounts towards ecosystem accounts building on the definition of land cover classes

¹ Two additional views of land are proposed for the CF update in Guidance Note A9.3: land ownership/tenure, and soil resources (with soil proposed to be linked to land rather than seen as independent environmental asset).

(paragraph 5.238). The suggestion that land cover classes can be used to represent ecosystem types in ecosystem accounting also appears in SEEA EA:

- a. Para A1.22 The link between data on ecosystem extent and data on land cover and land use needs to be highlighted in this context. For terrestrial areas there should be a reasonable concordance between data on land cover and ecosystem extent since land cover is a key variable in the delineation of ecosystem types. Further, for cultivated areas, data on land use may be considered in delineating ecosystem types.
- b. Para 3.76 As a final option, it may be necessary to use data on the single characteristic of land cover to provide an initial delineation of ecosystem assets.

37. However, land cover, land use and ecosystems are conceptually distinct and should not be conflated:

- a. Land cover refers to the observed physical and biological cover of the Earth's surface and includes natural vegetation and abiotic (non-living) surfaces (CF para 5.257).
- b. Land use reflects both (a) the activities undertaken and (b) the institutional arrangements put in place for a given area for the purposes of economic production, or the maintenance and restoration of environmental functions (CF para 5.246).
- c. An ecosystem is a dynamic complex of plant, animal and microorganism communities and their non-living environment interacting as a functional unit (Convention on Biological Diversity (CBD) Article 2, definition adopted in SEEA EA). Alongside this definition, *three attributes of ecosystems are often identified: composition, structure and function*. Composition relates to the suite of species that occur within the ecosystem, structure to the physical structure and patterns of the ecosystem, and function to ecological processes. These attributes are referred to frequently in SEEA EA.

38. The conceptual distinction between land cover, land use and ecosystems mean that land cover or land use *classes* and ecosystem *types* are also conceptually distinct. Ecosystem types are distinguished from each other by their compositional, structural and functional characteristics. Land cover classes are based predominantly on structural characteristics that can be discerned from remote sensing data, and do not consider the compositional and functional characteristics that are essential for distinguishing between different ecosystem types. One land cover class could contain several ecosystem types, and one ecosystem type could contain several land cover classes. Similarly, land use classes do not necessarily correspond to ecosystem types: a given land use may occur across multiple ecosystem types, and a given ecosystem type may support multiple land uses.

39. Some anthropogenic ecosystem types² are an exception, with land cover features like croplands and built-up areas often closely related to land use and broadly corresponding to anthropogenic ecosystem types such as croplands and urban ecosystems. However, especially

² Anthropogenic ecosystem types are those created and maintained through human interventions, where human interventions are the primary determinant of the composition, structure and functioning of the ecosystem. (Compilation Guidelines for GBF Headline Indicator A.2 Extent of natural ecosystems, advanced draft, July 2026)

for natural and semi-natural ecosystems, *land cover or land use classes are in general not an ecologically meaningful proxy for ecosystem types.*

40. This means that, in general, land cover accounts should not be treated as a starting point or substitute for ecosystem extent accounts.³ Ecosystem extent accounts should be based on a national ecosystem map that classifies and maps all ecosystem types in a country based on their compositional, structural and functional characteristics. *Guidelines for Developing National Ecosystem Maps* are available (Global Ecosystems Atlas, 2026). National ecosystem types should preferably be cross-referenced to the IUCN Global Ecosystem Typology, which is the reference classification for ecosystem types in SEEA EA.
41. Land cover classes in the SEEA CF are based on the FAO Land Cover Classification System (LCCS) (SEEA CF para 5.258-5.262). As discussed in the IUCN Guidelines for Cross-Referencing Ecosystem Classifications to the Global Ecosystem Typology (IUCN, 2025), land cover classifications and ecosystem classifications cannot be meaningfully cross-referenced to each other as the entities they classify are conceptually distinct (with the exception of some anthropogenic ecosystem types that have a close correspondence with some land cover classes, as noted above).

Treatment of forest land and forest ecosystems.

42. “In the SEEA, forests are considered a form of land cover and forestry is a category of land use” (SEEA CF paragraph 5.30). SEEA CF thus deals with forest land as a subset of all land, proposing physical asset accounts for forest and other wooded land (Section 5.6.4). Forestry is included in the land use classification. Definitions related to forest and other wooded land are based on the FAO Forest Resources Assessment 2010, in which forest land is determined by a combination of structural characteristics based on land cover (tree cover >10%) and some aspects of land use. For the Forest Resource Assessment 2025, the definition of forest land is: “Land spanning more than 0.5 hectares with trees higher than 5 meters and a canopy cover of more than 10 percent, or trees able to reach these thresholds in situ. It does not include land that is predominantly under agricultural or urban and use” (FAO, 2023).
43. The FAO definition of forest land is not an ecological definition, and does not correspond well with the concept of forest ecosystems as expressed in the Global Ecosystem Typology (GET). *Forest land includes many areas that are not considered forest ecosystems.* In work undertaken through the Forest Ecosystems Working Group of the Technical Committee on SEEA EA, an analysis was done to better understand the relationship between forest land and forest ecosystems, highlighting that there are multiple GET ecosystem functional groups characterised by trees at sufficient density to meet the FAO definition of forest land but which are not forest ecosystems, shown in Table 1. This includes many savanna ecosystems, which are globally extensive, covering roughly 2-3 billion hectares (about one-fifth of Earth’s land area), depending on the definition and classification applied.

³ In regions of the world where anthropogenic ecosystem types make up a large proportion of the total area, land cover classes may be a more suitable proxy for ecosystem types than in regions that have a substantial proportion of natural ecosystem types.

Table 1. Analysis of ecosystem functional groups (EFGs) in the Global Ecosystem Typology that are considered to be forest ecosystems, and those that may have sufficient tree cover to meet the FAO definition of forest land but are not considered to be forest ecosystems

13 EFGs are considered forest ecosystems:

- T1.1 Tropical/subtropical lowland rainforests
- T1.2 Tropical/subtropical dry forests and thickets
- T1.3 Tropical-subtropical montane forests
- T1.4 Tropical heath forests
- T2.1 Boreal and temperate high montane forests and woodlands
- T2.2 Deciduous temperate forests
- T2.3 Oceanic cool temperate rainforests
- T2.4 Warm temperate laurophyll forests
- T2.5 Temperate pyric humid forests
- T2.6 Temperate pyric sclerophyll forests and woodlands
- TF1.1 Tropical flooded forests and peat forests
- TF1.2 Subtropical/temperate forested wetlands
- MFT1.3 Intertidal forests and shrublands (mangrove forests)

7 EFGs have substantial tree cover but are NOT forest ecosystems:

- T4.1 Trophic savannas
- T4.2 Pyric tussock savannas
- T4.3 Hummock savannas
- T4.4 Temperate woodlands
- T3.1 Seasonally dry tropical shrublands
- T3.2 Seasonally dry temperate heath and shrublands
- T7.3 Plantations and woody croplands

The trees in some areas of these ecosystems may meet height and canopy cover thresholds for “forest land” but trees don’t drive the functioning of the ecosystem, which is a key characteristic of forest ecosystems.

For example, in savannas the functioning of the ecosystem is driven by grasses, not trees.

44. For ecosystem accounts to be meaningful for informing planning, action and monitoring for ecosystems, they should use an ecologically based approach to classifying and delineating forest ecosystems. For example, savanna ecosystems require fundamentally different approaches to management and restoration than forest ecosystems. Misclassifying ecosystems as forests can result in: misinterpretation of ecosystem condition variables (e.g. assuming that decline in tree cover indicates decline in condition and vice versa); actions that cause poor ecological outcomes and biodiversity loss (even if well-intentioned); and lack of meaningful information on state and trends, including of true forest ecosystems.
45. This means it is essential that forest land accounts and forest ecosystem accounts are not conflated. In broad terms, accounts for forest land fall within the scope of SEEA CF, and accounts for forest ecosystems fall within SEEA EA, generally as part of accounts for all ecosystem types. In practice, there are various “hybrid” sets of classes and datasets that have been developed, that combine elements of a land cover approach to identifying “forest” with ecological approaches. In accounting for “forests”, it is important to clarify whether they are defined based on the FAO definition of forest land, or an ecological definition of forests aligned with the Global Ecosystem Typology, or another definition.
46. Within SEEA CF it is also important to ensure that the relationship between forest land and timber is clear.
47. SEEA CF Section 6.5.5 introduces a combined presentation for “forest products”, which include timber, fuelwood and some non-timber forest products (“cork, gum, fodder, medicine, peat, etc”) that are shown in the table. The concept of forest products seems to be used only in this section, and it is not clear that it is needed in SEEA CF. It may be simplest to stick to timber and other wood products associated with forest land.

Use of species accounts for biological resources

48. Species accounts were introduced in SEEA EA in the context of accounting for biodiversity (Chapter 13, Section 13.3). They may also be relevant for biological resources in SEEA CF. The accounts have established practices itemised by species for the fish and timber accounts. Within the practice of SNA, some countries establish crop and stock models for biological resources which has some elements of a species account, cows aren't the same as sheep and goats, for instance. SEEA EA proposes species accounts in three distinct forms:
- a. species "status" in terms of extinction risk (based on the Red List of Threatened Species);
 - b. species stocks (e.g. in terms of presence or abundance); and
 - c. species distribution.
49. These approaches could add significant analytical power to biological resource accounts. Overlaying an extinction risk could determine if species of significance for food supply are at risk. Abundance or stock information could lead to better analysis of if harvest rates are sustainable. Finally species distribution, combined with some of the concepts from Issue A4 could demonstrate if industry is located in the right location to maximise their output, or if reserving of species ecosystems are improving their availability.

Treatment of monetary valuation

50. Valuation as a concept is introduced in section 2.7.3 of the SEEA CF. The basic principles are straightforward; value at exchange rates where the market price is observable, when market prices are not observable, then choose a market price equivalent. The standard also points out the opportunities to use non-market valuation techniques. The full text is at Annex 4. These concepts are largely coherent with the SNA and efforts to update SEEA CF with SNA 2025 are considered in Issues 9.1 to 9.4.
51. Special note can be made to understanding the compilation of asset valuation in SEEA CF section 5.4 (text is reproduced in Annex 4) which has approaches to valuation of monetary asset accounts with particular reference to Net Present Valuation (NPV). It is worth noting that the generally accepted practice for valuation of natural resource assets in SEEA CF and SNA is through using NPV. This issue will be discussed in more depth in Issue A.8.
52. SEEA EA Introduces the concept for guidance on valuation in para 1.29 noting that *"For entries in monetary terms, SEEA EA applies the concept of exchange values under which ecosystem services and ecosystem assets are valued at the prices at which they are exchanged or would be exchanged if there were markets present. This approach supports comparison of ecosystem accounting monetary values with those recorded in conventional economic and financial accounts."*
53. SEEA EA also notes that there are other approaches to valuation of nature which could be taken into account but are beyond the scope of SEEA. The SEEA EA reminds us that these accounts are not intended to provide an estimate of the complete 'value of nature' (para 1.30 SEEA EA).

54. Some interesting features of SEEA EA is that it suggests monetary valuation of ecosystems relies on physical data which is not mentioned in SEEA CF; it discusses why consumer surplus and non-use values are excluded.
55. Para A1.18 (SEEA EA) points out the primary difference between it and SEEA CF for monetary valuation: “... *The range of the flows that are within scope of valuation is the factor responsible for the primary difference between the two frameworks with respect to estimates of the monetary value of environmental assets. As noted above, in the SEEA Central Framework, flows are limited to those within scope of the SNA and are associated primarily with natural resource extraction and harvest. In ecosystem accounting, the scope of valuation is extended to capture all relevant ecosystem services. The inclusion in SEEA EA of a broad range of ecosystem services leads to an expansion of the scope of wealth since the underlying environmental assets are recognized as providing a wider set of benefits.*”
56. It is worth noting that Net Present Valuation techniques adopted from SEEA CF and SNA 2025 may not fully represent the economic value of environmental assets that have been created from ecosystems. Pascoe et al, 2026 notes that biological resources with repeat products will struggle to be represented by a residual amount based on the economic activity to extract the resource. Ultimately they recommend using alternate means to develop an economic value for ecosystem related products and assets. Mineral and energy assets are more stable users of NPV estimation, though there are challenges when the cost of extraction is greater than the operating surplus from sales of the mineral. Previous guidance recommended that if this is the case, then setting the asset value to zero was appropriate. Current guidance from the OECD (2025) suggests that one should seek to determine if these are true negative resource rents or record them as zero noting they are sub-optimally managed, and countries should record the SEEA based physical assets as a counterpoint to discussion.
57. Linking, therefore is more the process of environmental asset creation and determination of the most appropriate valuation technique:
- a. For biologically based assets and extraction, NPV is not recommended but alternative methods such as market based resource rent allocation are more approachable.
 - b. For mineral and energy assets, NPV is the likely technique, but steps need to be taken to minimise the risk of excessing return on capital, cost of production and depreciation impacting on the calculation of a resource rent value.
 - c. For water based assets, only repeat use cases seem to reflect the residual based value of this natural resource. Issue D3 valuation of water resources may have a better reflection. In the least case scenario, treating water as a produced asset should better reflect the valuation that can be applied to the water as an asset (ie. Water stored as opposed to water flowing through service pipes to consumers.)
58. On the issue of double counting, it should be noted that since ecosystem accounts and natural resource accounts are on different sides of the production boundary then it is at the compilers risk to add these together for a ‘total economic value’ of the environment. It is worth noting that SNA struggles to treat assets with multiple uses and will tend towards either valuation

from each asset class or value the predominate capital service as the base for the asset value. The environment is a complex asset class if ecosystems are natural resources are treated as if coming from the same location or extent.

3 OPTIONS AND POSSIBLE TREATMENTS

59. One option is to include a new section on discussing the overlaps and differences between SEEA EA and SEEA CF. This could include wording in chapter 2 on the links between SEEA CF accounts and the potential for linking various ecosystem accounts, for example:
- a. Pressure accounts potential link to the construction of ecosystem condition accounts if they are at the right spatial scale.
 - b. The links from land accounts understanding any changes in ecosystem extent.
 - c. The overlap of some ecosystem services with natural resource inputs and the indirect use of some ecosystem services to allay economic pressures on ecosystems .
 - d. The coherence in approaches for monetary valuation of assets, noting the alignment of the production boundary between SEEA EA assets and SEEA CF and SNA assets.
 - e. Noting the exclusion of a 'full value' for nature from a SEEA perspective and that approaches for non-market valuation will impact on the ability of aggregate measures for the environment. This could serve as a warning about the potential for double counting
60. his guidance note recommends updating SEEA CF with the correct reference to ecosystem accounts, including definitions of abiotic when referring to components of the accounts as defined by:
- a. Abiotic contributions to benefits from the environment that are not underpinned by, or reliant on, ecological characteristics and processes.
61. The presentation of supply use tables in chapter 2 could be modified to include an expanded table including ecosystem services into the generic supply use table as well as expanded destination for residuals (pending discussion in Issue B6). At the least some note that some provisioning services should be sourced from ecosystems in the core tables.
62. Chapter 2 should contain an elaboration of the asset boundary between ecosystems and the extended assets of SEEA CF based on some of the work in Issue A8 where a standard model of accounts for the environment is discussed and is an expansion of the stepwise discussion of the relationship between ecosystems and individual environmental assets in the summary of research above. In relation to ecosystems there should be elaboration of:
- a. The creation and ownership of individual environmental assets that are from ecosystems via entries in the accounts

- b. The adoption of ecosystem services that have SNA-benefits being accounted for through standard accounts tables. In this case the recognition that primarily provisioning services are finished products for inventories and are created as produced assets (Issue A8, D4).
 - c. The treatment of externalities from the economy back to ecosystems should adopt the modular accounts approach from Issue B6, where residuals and losses are stored in ecosystems prior to assimilation or accumulation in ecosystems.
63. Clarify the relationship between land cover, land use and ecosystem types in Section 5.6 Asset accounts for land, including a new paragraph after in Section 5.6.1 (after paragraph 5.238) and revision of Section 5.6.6 Links to ecosystem accounting.
64. Clarify in in paragraph 5.30 and in section 5.6.4 Physical asset accounts for forest and other wooded land that the focus of SEEA CF is on accounting for forest land rather than forest ecosystems, with an explicit distinction and differentiation between the two. Refer to SEEA EA for accounts that focus on forest ecosystems. SEEA CF should refer to “forest land” consistently, not abbreviated to “forest” (this is consistent with how forest land is referred to in the SNA.)
65. Refine the text for including elaboration by including species accounts (from section 13.3.3 SEEA EA) co-located with discussions on timber accounts and biological resources.
66. There are two options for incorporating the lessons from SEEA EA on the topic of valuation:
- a. Consider moving all of the discussion on valuation to a chapter or large section (similar format to SEEA EA).
 - b. Consider extending or rewriting section 2.7.3 on valuation in Chapter 2 to include text on the range of options for valuation reflecting the approach in section 8.1 of SEEA EA and extend beyond the NPV estimation process. Noting that NPV measures are the preferred option for depletion estimates in the SNA (Issue 9.1).

4 PROPOSALS AND RECOMMENDATIONS

67. A summary of proposals pending review by the SEEA Technical Committee in September 2026:
- a. Include a new sub-section or appendix outlining the links between SEEA CF and SEEA EA, aligned with the approach used in SEEA EA Appendix A1.2
 - b. Terminology changes
 - i. Introduce the term abiotic flows, with the same definition used in SEEA EA, and make the link to natural inputs
 - c. Elaboration on production and asset boundaries between SEEA EA and SEEA CF, for example:
 - i. Alignment with A8 – formal creation of ownership of environmental assets

- ii. Alignment with B6 – formal recognition of Ecosystems having a role to manage externalities
 - iii. Discuss extensions of the environmental SUT with ecosystem services
- d. Clarify the relationship between land accounts and ecosystem extent accounts
- e. Clarify differences in treatment of forests between SEEA CF and SEEA EA
- f. Use of species accounts
 - i. Should be considered for accounts related to biological resources
 - ii. Should be considered in any revision to SEEA AFF
- g. Elaborates the treatment of monetary valuation based on experiences in SEEA EA and linking implications.

5 OTHER CONSIDERATIONS IN ADVANCING THE ISSUE

68. The elaboration of the linking between asset, flow and environmental activity accounts (Issue A8) will be a factor in determining the links between SEEA CF and SEEA EA. It is likely that more research will be needed to consider how restoration expenditure and potentially sustainable finance interacts with the physical environment. As yet there are no clear perspectives on how regulating services deal with pressures (Issue B6) albeit from a capacity or a warehousing function.
69. Resolving the issues around monetary valuation still requires some resolution from a global perspective. Ultimately exchange value is the ideal for measuring transactions but options like residual value of resource rent may not fully represent economic value of the environment. Some lessons are available from the process of unpacking valuation in SEEA EA, but it is unclear if this should be the same for SEEA CF given the proximity to the asset boundary.
70. SEEA Agriculture, Fishing and Forestry should be updated to reflect both the changes proposed in this guidance note on the creation of assets from ecosystem and that SNA benefits are usually finished products stored prior to consumption. There is also a opportunity to reflect on cultivated biological resources and fill the gap between SEEA CF and SNA.

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ANNEXES

Annex 1 Summary of links and differences between SEEA CF and SEEA EA, based on SEEA EA Appendix A1.2.

Table 2. Comparing SEEA CF and SEEA EA, drawn from SEEA EA Appendix A1.2

SEEA Central Framework	SEEA Ecosystem Accounting	Paragraph reference and notes
Scope		
Focuses on individual environmental assets	Focuses on ecosystem assets	A1.12 Difference
Physical asset boundary is broader than the SNA asset boundary	Physical asset boundary is broader than the SNA asset boundary	A1.12 Equivalence (CF and EA have the same biophysical scope)
Considers only SNA benefits arising from individual environmental assets	Considers both SNA benefits and non-SNA benefits arising from ecosystem assets and services	A1.14 Difference
Within the DPSIR framework, focuses primarily on Pressure and Response components	Within the DSPIR framework, focuses primarily on State and Impact components	A1.15, A1.16 Difference

SEEA Central Framework	SEEA Ecosystem Accounting	Paragraph reference and notes
Typically focuses on the national scale; not spatially detailed (although with new proposed content in CF update to encourage spatially detailed accounts where possible)	Typically spatially detailed, allowing for focus on national and sub-national scales	A1.17, A1.34 Also see GN A4 Accounting at different spatial scales
Scope of monetary valuation limited to SNA benefits	Scope of monetary valuation includes SNA benefits and non-SNA benefits	A1.18 Difference (Monetary scope of EA is broader than CF)
Uses the exchange value concept and NPV approach for valuation of environmental assets	Uses the exchange value concept and NPV approach for valuation of ecosystem assets	A1.18 Equivalence
Environmental assets and related stocks		
Focuses on individual environmental assets.	Focuses on the ecosystems within which individual environmental assets are located	A1.20
In principle, there should be coherence between physical changes in the stock of individual environmental assets...	...and physical changes in the associated stock of ecosystem assets	A1.21
Uses the concept of <i>depletion</i> in relation to natural resources	Uses the concept of <i>degradation</i> in relation to ecosystem assets, linked to a decline in the future flow of ecosystem services combined with a decline in ecosystem condition	A1.25, A1.26 Difference Also see GN A9.1 for proposed change to definition of depletion
Environmental flows		
Focuses on three types of flows: <i>natural inputs, products and residuals</i>	Focuses on one type of flow: ecosystem services	A1.27 Difference
Some <i>natural inputs</i> correspond with some provisioning ecosystem services	Some provisioning ecosystem services correspond with some natural inputs	A1.28 See separate table below
Physical flows of some <i>products</i> may be linked to some biomass provisioning services	Some biomass provisioning services may be inputs to flows of some products (e.g. grazed biomass as an input to livestock products, crop biomass as an input to crop products)	A1.29

SEEA Central Framework	SEEA Ecosystem Accounting	Paragraph reference and notes
Some <i>residuals</i> relate to pressures on ecosystems that impact on their condition	In general, residuals not recorded directly in ecosystem accounts	A1.30 See GN B6 on proposed CF pressure accounts that link residuals more directly to pressures on ecosystems
Does not address regulating or cultural ecosystem services	Accounts for regulating and cultural ecosystem services	A1.33 Difference
Environmental transactions		
Environmental Protection Expenditure accounts include activities related to conservation, management and restoration of ecosystems	[Which classes are most relevant to EA?]	A1.35, A1.36
Environmental taxes and subsidies include some related to ecosystems	[Can we say more here?]	A1.37

Table 3. Links between natural inputs (SEEA CF) and ecosystem services (SEEA EA)

Natural input	Related ecosystem service
Mineral resources (abiotic flows)	--
Energy resources (abiotic flows)	--
Soil resources (excavated)	-- (No direct link to soil quality regulation services or soil erosion control services).
Timber (natural/uncultivated)	Wood biomass provisioning (includes cultivated and uncultivated production contexts)
Aquatic resources e.g. fish (natural/uncultivated)	Wild fish and other natural aquatic biomass provisioning (uncultivated) (Aquaculture provisioning services (cultivated) are accounted for as a separate service)
Other biological resources (natural/uncultivated)	Wild animals, plants and other biomass provisioning (uncultivated)
Water resources (abiotic flows)	May be recorded as a proxy for regulating ecosystem services that underpin the supply of water (water flow regulation, water purification) (A1.28), but the preference in SEEA EA is to record the regulating services. In general, water supply should be treated as an abiotic flow and not recorded as an ecosystem service.

Inputs of nutrients, carbon, nitrogen and other elements	May be relevant for measurement of some regulating services (A1.28) May relate to provisioning services in cultivated production contexts (Obst 2019)
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Annex 2 Ecosystem accounting references in SEEA CF

1. 1.17 The second area of work became focused on accounting for the environment from the perspective of ecosystems and the outcomes are presented in SEEA Experimental Ecosystem Accounting. This publication describes the measurement of the flow of services to humanity provided by ecosystems, and the measurement of ecosystem condition in terms of the capacity of ecosystems to provide services. While SEEA Experimental Ecosystem Accounting is not a statistical standard, it provides a consistent and coherent synthesis of current knowledge regarding an accounting approach to the measurement of ecosystems within a model that complements the SEEA Central Framework. SEEA Experimental Ecosystem Accounting provides a basis for countries to advance research into ecosystem accounting using terms and concepts that facilitate the comparison of statistics and the exchange of experiences.
2. 1.18 SEEA Experimental Ecosystem Accounting describes the measurement of ecosystems in physical terms, and the valuation of ecosystems in so far as it is consistent with market valuation principles. It is to be noted that only those issues on which relatively broad directions have emerged are included. In accounting terms, many of the structures for ecosystem accounting are drawn from the structures in the SEEA Central Framework and, in this regard, the accounting conventions of the SEEA Central Framework are applied consistently.
3. 1.7 The SEEA Central Framework is complemented by two publications: SEEA Experimental Ecosystem Accounting, and SEEA Applications and Extensions. Their content is outlined later in the present section.
4. 1.27 An important aspect of chapter II is that it highlights the integrated nature of the SEEA Central Framework and the fact that all of the different components are encompassed within a common accounting structure. The content of that chapter is also applicable to publications related to the SEEA Central Framework such as SEEA Experimental Ecosystem Accounting.
5. 2.21 The second perspective on environmental assets, which is described in SEEA Experimental Ecosystem Accounting, encompasses the same environmental assets but focuses on the interactions between individual environmental assets within ecosystems, and on the broad set of material and non-material benefits that accrue to the economy and other human activity from flows of ecosystem services. Ecosystems are a dynamic complex of plant, animal and microorganism communities and their non-living environment interacting as a functional unit.² Examples are terrestrial ecosystems (e.g., forests and wetlands) and marine ecosystems. Often, there are interactions between different ecosystems at local and global levels.
6. 2.22 For a given ecosystem or group of ecosystems, ecosystem accounting considers the capacity of living components within their non-living environment to work together to generate flows known as ecosystem services. Ecosystem services are the contributions of ecosystems to

benefits used in economic and other human activity. Ecosystem services, which are supplied in many ways and vary from ecosystem to ecosystem, may be divided into three groups: (a) provisioning services (such as the provision of timber from forests); (b) regulating services (provided, for example, by forests when they act as a sink for carbon); and (c) cultural services (such as the enjoyment provided to visitors to a national park).³ Generally, provisioning services are related to the material benefits of environmental assets, whereas the other types of ecosystem services are related to the non-material benefits of environmental assets.

7. 2.23 Degradation of ecosystems by economic and other human activity may mean that they are not able to generate the same range, quantity or quality of ecosystem services on an ongoing basis. A focus on ecosystems that includes both material and non-material benefits of environmental assets provides a basis for analysing the extent to which economic activity may reduce an ecosystem's capacity to generate ecosystem services.
8. 2.105 In the Central Framework, a monetary value is not placed on all of the benefits that may accrue to current and future generations so as to provide what might be regarded as social valuations of environmental assets. The consideration of the value in monetary terms of a broader range of benefits from the environment is discussed in SEEA Experimental Ecosystem Accounts.
9. 3.107 The environmental pressures imposed by residuals relate to residual flows from the current period as well as those from past periods, given the potential of residuals to accumulate. The effects of continuing the existing flow of residuals may differ significantly depending on the level already accumulated at the beginning of the period. The measurement of the effect of flows of residuals on the state and quality of the ecosystems that receive them is addressed in SEEA Experimental Ecosystem Accounting.
10. 4.31 Based on the definitions of environmental activities, it is possible to define environmental goods and services and environmental producers. Environmental goods and services are different from ecosystem services. "Ecosystem services" is the term used to describe the contributions of ecosystems to benefits used in economic and other human activity (e.g., extracted natural resources, carbon sequestration and recreational opportunities). In contrast, environmental goods and services in the SEEA comprise only flows of products within the economy.
11. 4.126 The role of government in the interactions between the economy and the environment is of interest to many. For politicians and government officials, there is particular interest in determining whether various incentives or penalties can be effectively used to influence economic and human behaviour in relation to the environment. For households and enterprises, there is interest in knowing the costs and benefits involved in using natural resources (such as timber resources) and ecosystem services (such as the atmosphere, as a sink for pollution).
12. 5.8 As defined in chapter II, environmental assets are the naturally occurring living and non-living components of the Earth, together constituting the biophysical environment, which may provide benefits to humanity. In the Central Framework, environmental assets are viewed in

terms of the individual components that make up the environment, with no direct account taken of the interactions between these components as part of ecosystems.

13. **The relationship between depletion and degradation:** 5.88 Although the measurement of degradation in physical and monetary terms is not pursued in the Central Framework, there are links with the definition and measurement of depletion that are explained in the Central Framework. The measurement of degradation is considered in the SEEA Experimental Ecosystem Accounting.
14. 5.89 The focus in measuring depletion is on the availability of individual environmental assets in the future and changes in that availability due to extraction and harvest by economic units. There is a particular focus on the specific benefits that arise from the extracted materials, including the capacity of the extraction of the resources to generate income for the extractor.
15. 5.90 Degradation considers changes in the capacity of environmental assets to deliver a broad range of contributions known as ecosystem services (e.g., air filtration services from forests) and the extent to which this capacity may be reduced through the action of economic units, including households. In this sense, since depletion relates to one type of ecosystem service, it can be considered a specific form of degradation.
16. 5.91 The measurement of degradation is complicated because the capacity of environmental assets to deliver ecosystem services is not attributable solely to individual assets, and because individual assets may deliver a number of different ecosystem services. Further, while individual environmental assets, such as water and soil resources, may have been degraded over time, separating the degradation of an individual asset from the degradation of the overall ecosystem may not be straightforward.
17. 5.92 The measurement of degradation in physical terms is also complicated inasmuch as it generally relies on a detailed assessment of the condition of ecosystems rather than the relatively simpler changes in the quantities of individual environmental assets that are used in the estimation of asset accounts in physical terms and in the estimation of depletion. For example, to assess whether a body of water has been degraded, assessments might be made of the various pollutants in the water as part of a broader assessment of the overall change in condition. While individual accounting for each of these pollutants might be undertaken, it will not be directly related to the volume of water in cubic metres that is used to account for water resources in an asset account.
18. 5.93 Although separately identifying degradation in physical terms is complex, implicitly, the monetary value of individual environmental assets that have been degraded will be affected by the changing quality of the asset. Ideally, where the price of the asset changes to reflect a different quality, this should be considered a change in the volume of the asset rather than a revaluation. However, isolating the price change due to degradation from other causes of price change is likely to be difficult in practice.
19. 5.238 The present section is structured to define the scope of land accounts and define two primary aspects of land for environmental accounting purposes: land use and land cover. Categories and classes for the organization of data on land use and land cover are presented

followed by a description of land accounts in physical terms. A particular focus is placed on physical land accounts for forest and other wooded land which complement the asset accounts for timber resources discussed in section 5.8. Land accounts in monetary terms are described next. The potential extension of land accounts towards ecosystem accounts building on the definitions of the land cover classes is discussed at the end of this section. Section 5.6.6 Links to ecosystem accounting

20. 5.6.6 Links to ecosystem accounting: 5.316 Ecosystem accounts are founded on consideration of the capacity of the environment to deliver ecosystem services as described in chapter II. It is the interactions between different environmental assets within a given area that generates ecosystem services.
21. 5.317 To the extent that meaningful groupings of land areas can be defined, these areas may be used to provide a measurement basis for ecosystem accounting in a similar way to which statistical units, such as establishments, provide a basis for measurement in economic statistics. SEEA Experimental Ecosystem Accounting develops these ideas in detail to provide a framework for assessing the capacity of ecosystems to deliver ecosystem services.
22. 5.323 Some aspects of accounting for soil resources fit easily into the broader asset accounting framework described in the Central Framework. Also, some of the physical flows associated with soil resources, for example, flows of nutrients, are within the framework of physical flows described in chapter III. More broadly, accounting for soil resources as a system providing multiple benefits is a part of the broader subject of ecosystem accounting and is described in SEEA Experimental Ecosystem Accounting.
23. 5.370 It is noted that the concept of sustainable yield used to define depletion does not take into account the broader ecological sustainability of the surrounding ecosystems which may be affected by the felling and removal of timber resources.
24. Section 5.8.5 Carbon accounts for timber resources: 5.392 A complete articulation of carbon accounting, including, for example, carbon sequestration in soils, is beyond the scope of the Central Framework but is discussed in SEEA Experimental Ecosystem Accounting. This reflects the fact that calculation methods are still developing and that an ecologically grounded accounting approach is required to fully account for stocks and flows of carbon and provide information for policy in this area. At the same time, it is noted that the underlying accounting models in the Central Framework are sufficiently well developed for use in carbon accounting for timber and other stores of carbon.
25. Section 5.9 Aquatic resources: 5.396 The asset accounts presented in the present section do not cover the assessment of general aquatic ecosystems that support the various resources and provide a wide range of ecosystem services. The measurement of ecosystems is described in SEEA Experimental Ecosystem Accounting.
26. This one is slightly odd, it is referred to in the index as “Links to ecosystem accounting” 5.430 Conceptually, “gross removal” is the most appropriate concept for measuring the impact on aquatic resources and the damage to aquatic ecosystems, e.g., to coral reefs, as a result of fishing activity. However, the measurement of gross removal is not possible in practice.

27. Section 5.10.2 Accounting for natural biological resources: 5.468 As natural biological resources form an important part of biodiversity and ecosystems in particular regions, there may be interest in compiling data on the availability and extraction of these resources at subnational spatial levels. Further, information on these resources may be able to form an input into broader measures of ecosystems that are discussed in SEEA Experimental Ecosystem Accounting.
28. A2.8 The research topics outlined here do not cover topics related to the development of ecosystem accounting. The status of accounting for ecosystems will be presented in the publication of SEEA Experimental Ecosystem Accounting, which is currently under development. The SEEA Experimental Ecosystem Accounting will recognize the need for ongoing research and experimentation in ecosystem accounting. Particular areas in which ongoing research is likely to be required include accounting for overall ecosystem condition and capacity, accounting for biodiversity, carbon accounting, accounting for economic instruments used by government in relation to the management of ecosystems, and techniques for the valuation of ecosystems.
29. A2.9 In addition, research and development in some of the areas included in the research agenda of the SEEA Central Framework might be usefully combined with work on ecosystem accounting. Specifically, research work on accounting for soil resources, the valuation of water resources, and the development of land cover and land use classifications might be considered within the context of research on ecosystem accounting.

Annex 3, Case study on mineral (non-renewable assets)

Pending...

Annex 4, Valuation extracts from SEEA CF and SEEA EA

Pending....